

CHAPTER 2

CVWF DESIGN CONCEPT

2-1. Overview

The standard CVWF consists of a vehicle preparation area, wash stations, and vehicle assembly area (fig 24). However, the layout of a facility will be site-specific, based on the installation's mission and needs. Information on siting and master planning is found in chapter 3. A design example is provided in appendix A.

2-2. Prewash (optional)

At installations with heavy soiling conditions, high demands for washing, and/or limited washing times, a prewash system is recommended. Three types of prewash systems have been constructed for use in tactical vehicle washing: bath, spray stand, and automatic washer. The vehicle bath is the most effective prewash system for Army tactical vehicles. Figure 2-2 shows a typical CVWF plan with the CONUS approved bath prewash system for tactical vehicles. Commercial type, such as those in a Transportation Motor Pool (TMP), would utilize commercial automatic washers and not facilities described for the CVWF.

2-3. Wastewater treatment

A system for conveying and treating wastewater is included in the CVWF design, since water used to wash the vehicles will become contaminated with dirt, debris, and products related to vehicle operation such as oil and grease. All wastewater must receive primary treatment to remove settleable and floating materials. Following primary treatment, the wastewater is either released to a collection system or further treated onsite and stored for reuse during future washing operations. The water used to wash vehicles should be recycled whenever possible and feasible. However, even in a total recycle system, some of the wastewater may need to be released to a discharge system before or after receiving secondary treatment. This discharge is done to ensure that water quality and water balance are maintained. Measured makeup water is added to the recycle system to compensate for the volume of water carried off on the wet vehicles, released, and lost to evaporation.

a. Primary treatment. All wastewater must receive primary treatment. A sediment basin that provides primary treatment is required to allow most of the suspended solids to settle and to allow the free grease and oils to separate from the wastewater.

b. Secondary treatment. For the purposes of this manual, secondary treatment refers to intermittent sand filters, lagoons, or discharges to sanitary sewage systems. Two systems of onsite secondary treatment are used following primary treatment if the water is to be recycled. These methods include intermittent sand filters and lagoons. Lagoons are not the standard system but are included because they have been used as a wastewater treatment method for CVWFs. The third system of handling wastewater, discharge to sanitary sewer, may be available at an installation, but this method is not used in conjunction with a recycle system.

In a discharge system, secondary treatment is done at the installation, local municipal, or regional sanitary wastewater treatment facility. Essentially, all recycle systems are partial treatment systems, as release of some wastewater may become necessary to maintain water quality and to allow discharge of excess storm water collected at the facility.

- (1) *Intermittent sand filter system.* This secondary treatment system is comprised of an equalization basin and an intermittent sand filter. The equalization basin holds the wastewater after primary treatment and before it is applied to the filters to equalize flow rates by dampening the high and low-flow variations.
 - (a) A dosing tank may be provided after the flow equalization basin to provide a water volume of one charge or dose to a portion of the sand filter. The dosing tank is a designer's option which allows for flexibility in sizing the pumping facilities.
 - (b) Water quality testing and metering capabilities are recommended to be provided at a point following the intermittent sand filters to measure the quality and amount of the treated wastewater to be recycled. At this point, facilities should be provided which allow recirculating all or a portion of the filtered water back through filters via the equalization basin. The remaining filtered water flows into the water supply basin and is stored for reuse.
 - (c) Water overflow facilities to provide hydraulic protection for the secondary treatment process should be located at the water supply basin for emergency storm release. This overflow system should also be able to make controlled partial wastewater releases to further assist in maintaining the quality and quantity of the recycled water. Hydraulic protection should also be provided at the equalization basin as a backup. Chapter 6 presents details of the sand filter treatment system.
- (2) *Lagoon system.* This secondary treatment system consists of a basin or a series of basins where the wastewater is held for an extended period of time to achieve the desired water quality. The treated water is allowed to flow to the water supply basin for reuse. Water quality testing and metering capabilities are recommended to be provided, as well as overflow protection. Chapter 6 explains the lagoon treatment system in greater detail.

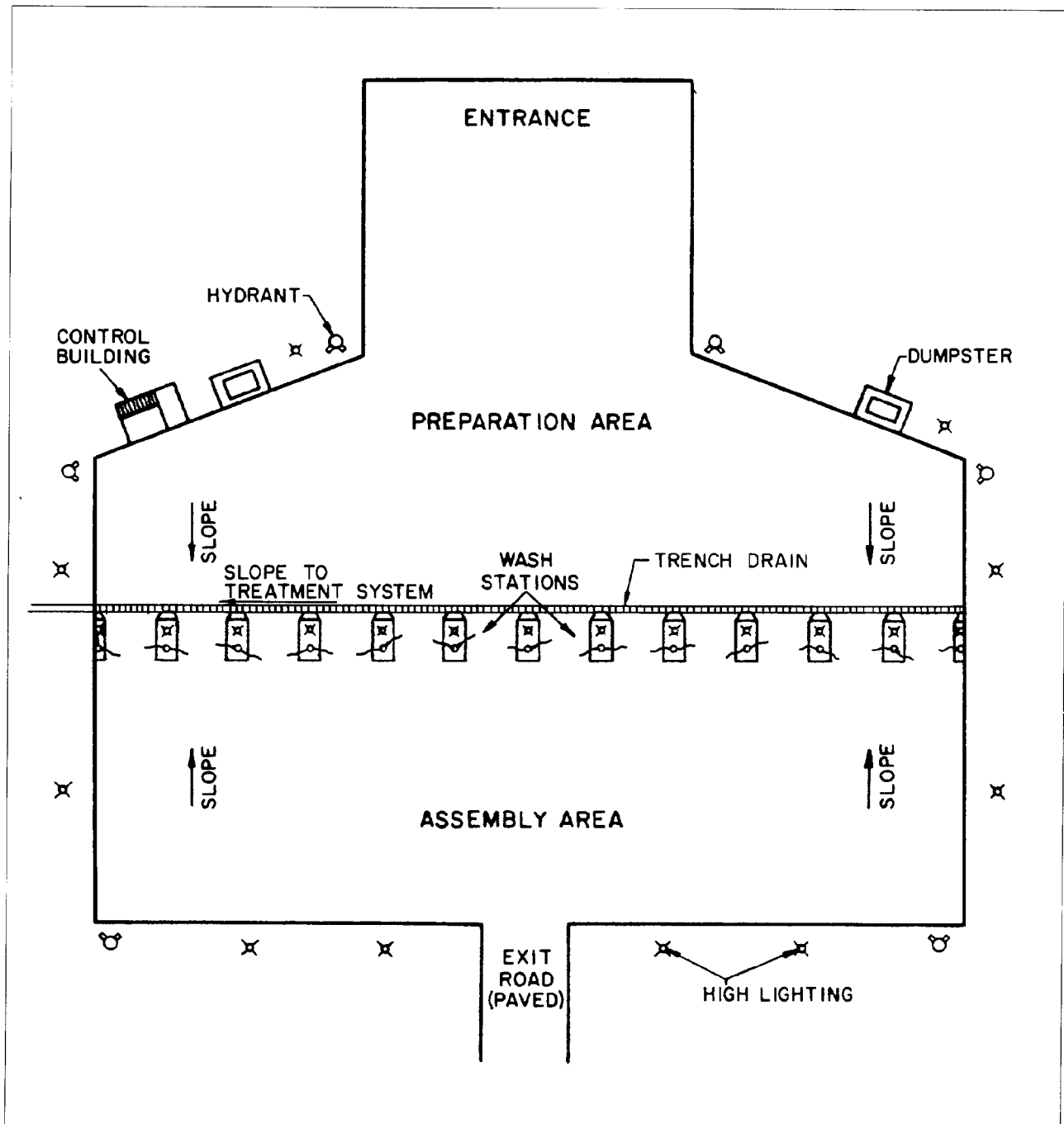


Figure 2-1. Standard central vehicle wash facility plan.

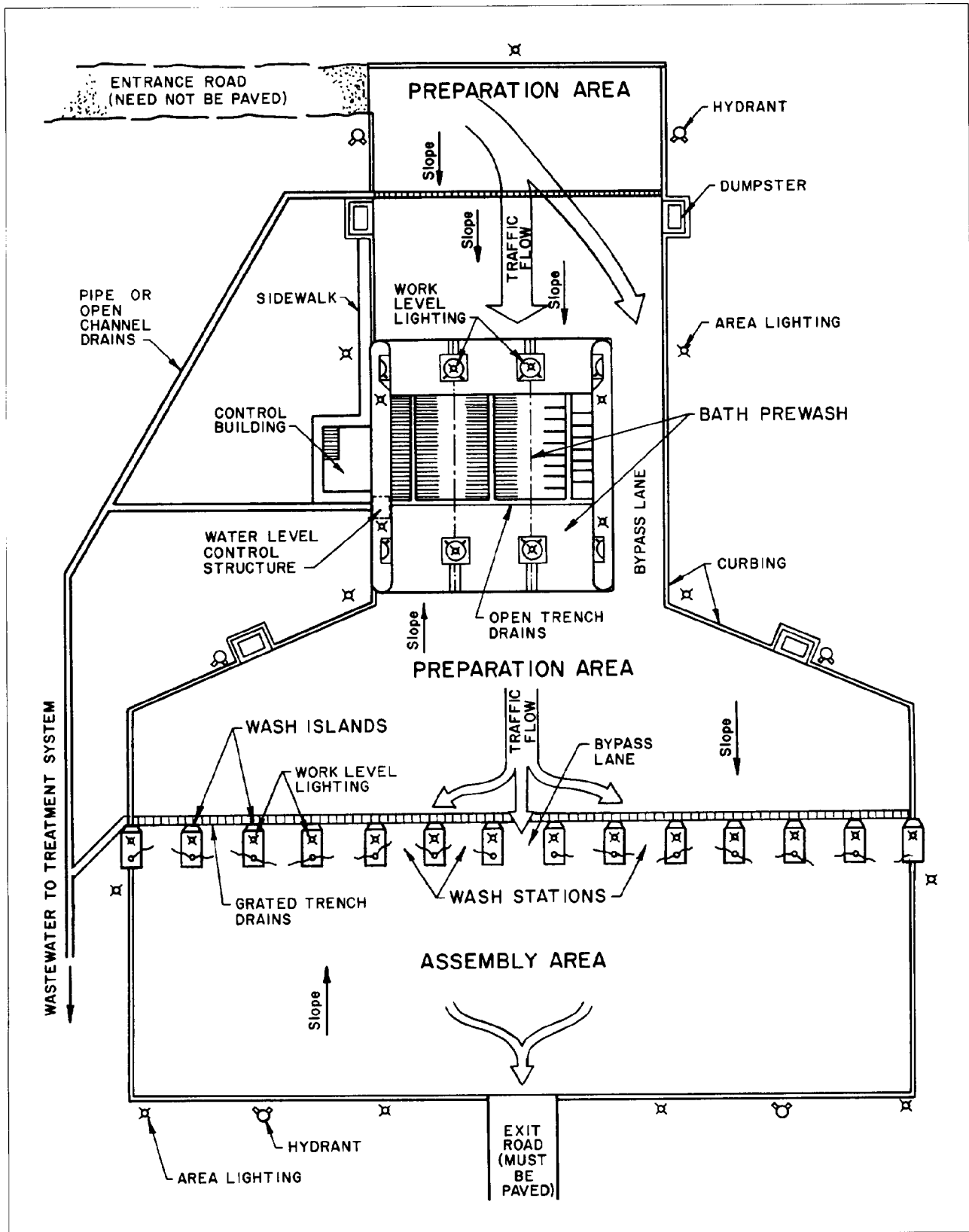


Figure 2-2. Central vehicle wash facility plan with bath prewash.

- (3) *Discharge system.* If a recycle treatment system is not economically or technically feasible and/or operationally practical, and if wash water supply is available, wastewater from the CVWF may be discharged to a sanitary sewer system or some other conveyance for further treatment elsewhere. Primary treatment is the minimum level of treatment required to ensure that the wastewater discharged into a system is of a quality acceptable to the receiving authority. Quality, however, may not be the only criterion. The rate of discharge may also be a limiting factor, thus requiring an equalization basin prior to the point of release to the discharge system. The discharge-type treatment system is discussed in detail in chapter 6.

c. Water supply basin. After secondary treatment in a recycle system, the water is discharged to a water supply basin for reuse in the CVWF. In a system without recycling, the water supply basin is optional. If a reliable, consistent source of water is not available, a water supply basin may have to be constructed in a size large enough to hold the wash water volume required. This basin can be filled from the water source at a slower rate during nonpeak hours for the high demand required during the washing operations. The design must protect the water source through the use of air breaks or equipment to prevent backflow and back siphonage. In addition, makeup water that enters the water supply should be metered.